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Cambridge Service Alliance

# Enterprise Imaging: Representing Complex Multi-organizational Service Enterprises

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This is a Working Paper

## Why this paper might be of interest to Alliance Partners:

Enterprise Imaging is a way of providing a picture of a multi-organizational enterprise that provides products and/or service outputs. This paper describes the research basis for the image, the process for its construction, and its benefits. For managers the Image can support service enterprise management teams to i) understand the boundaries and interdependencies of their service enterprise; ii) operate as an initiator and support for discussion at the enterprise level; iii) provide a common reference point for multiple perspectives; and iv) form a basis for co-creating holistic enterprise management processes.

The research has been based on existing contracts; however, Enterprise Images may be useful during the development of a contract when the interactions between stakeholders can be explored more flexibly. The application of Enterprise Imaging may also cast new light on provider/client interactions within a product-focused contract where traditionally the role of the customer has been underplayed.

A web-based tool for drawing Enterprise Images is available from http://www.aimpractice.com/our-products/toolkit?id=21 where further details can be found.

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# Enterprise Imaging: Representing Complex Multi-organizational Service Enterprises

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## Introduction

This paper develops a method for creating a visual depiction of a service enterprise, acknowledging both client and service provider roles in enabling behaviours that promote value co-creation (Vargo & Lusch, 2006). The widely recognized move by many product focused companies towards integrating product and service offerings in a service focused business model presents new managerial/operational challenges for participating organizations, particularly in the context of complex engineering services (Baines et al., 2007; Wilkinson, Dainty & Neely, 2009). As Agarwal & Selen (2009) highlight, the provision of complex and innovative services requires multi-organizational collaboration. Customers become factors in production (Ramirez, 1999) as service often entails the utilization of customer resources as part of the realization of value (Vargo & Lusch 2006). Yet current models and visual representations for understanding the delivery of value are mostly provider and product-focused and depict inward value flows, internal value transformations and outward flows to an uninvolved customer. Basoule & Rouse (2008, p. 54) argue that:

> "Existing models, traditionally used for describing the exchange of physical products, will not apply in the services context in which close interactions between suppliers, service providers, and customers exist, where knowledge is created and exchanged, and experiences, capabilities, and relationships are an integral part of the transaction."

Spring & Araujo (2009) support the need for further development of methods to represent the complex organizational arrangements involved in the co-creation of value between clients and providers in service settings. In this paper a detailed case study of an availability contract between a public sector client and private sector providers is used to develop new methods of enterprise representation. The paper has been organized into six sections:

1. A literature review addressing the evolution of multi-organizational enterprises in value co-creation and the use of images to aid the understanding of organizational phenomena;
2. A description of the research methodology used;
3. Analysis of the support contract 'Availability Transformation: Tornado Aircraft Contracts' (ATTAC) leading to the identification of twenty-one organizational units involved and their placement on the generic Enterprise Image. The units included sub-organizations

within both the prime service provider and the client as well as third party provider organizations;
4. An examination of the validity and utility of the visualization, and evaluation of the enterprise imaging tool
5. A section on the managerial implications of the research; and finally
6. A summary section covering conclusions and areas of further research.

## 1.0 Literature Review

The review addresses two areas of existing research: the evolution of multi-organizational enterprises in value co-creation and the use of visualizations to aid the understanding of organizational phenomena. The review is focused upon representations of multiple organizations and specifically representations of the interactions between service providers and their clients.

### 1.1 The need for a holistic understanding of multi-organizational enterprises in value co-creation

In this section factors leading to the emergence of multi-organizational enterprises are outlined and the need for holistic enterprise management is discussed, particularly in a complex, servitized environment. Outsourcing and virtualization have meant that companies increasingly create value through joint activities, working beyond the boundaries of a traditional, autonomous company or legal entity (Binder & Clegg, 2007). Multi-organizational collaboration to deliver service has become more prevalent and key driving factors have been proposed (Purchase et al., 2011a&b) including: the growing requirement of customers to have holistic integrated solutions; the increasing involvement of customers in the 'co-creation of value'; and finally, the need to work systemically with stakeholders to reduce costs and improve performance. While individual organizations have been engaged in narrowing their strategic focus onto certain technologies, services, or processes, customers are moving in the opposite direction by increasingly seeking total solutions. In the defence sector, for example, there is a clear move towards seeking total solutions for maintenance and upgrade of military platforms, as evidenced in the rise of through-life support and availability contracts (Ministry of Defence, 2005; Department of Defense, 2010). To meet this developing need private sector organizations seek to offer total, systemic product or service solutions. However, few organizations are able to provide a one-stop solution from their own resources and so meeting this need is typically achieved by entering into collaborative relationships where partners engage in collective activities with common enterprise goals (Binder & Clegg, 2007). Binder & Clegg (2007, p.422) go on to point out that such enterprises can also be made up of the activities of sub-parts of different companies. Hence, only one part of a large company might be involved in a multi-organizational enterprise

> '…whilst other parts of the same company are operating on a completely different modus operandi with their partners and suppliers.'

The term 'enterprise' is adopted throughout this paper to refer to the complex arrangements of sub-organizational units from a variety of provider and client organizations that collaborate to

deliver a given service. Explored in some depth in another paper (Purchase et al., 2011c, p. 20), the salient features of 'enterprise' are captured in the following:

> 'a boundary defining lens which imposes a holistic management or research perspective on a complex system of interconnected and interdependent activities undertaken by a diverse network of stakeholders for the achievement of a common significant purpose.'

Over the years a wide variety of terms have been used to describe diverse collections of organizations who have aligned for value delivery, including 'extended enterprises' (Coughlin, et al., 2003), 'value chains' (Porter, 1985; Walters & Lancaster, 2000), 'value streams' (Hines et al., 2000) and 'service value networks' (Agarwal & Selen, 2009; Lusch et al., 2010). There remains significant scope for clarification and alignment of definitions in both the supply chain and marketing literature (Mills et al., 2004; Lusch et al., 2010) which is beyond the scope of this paper. Yet despite often differing terminology, there is wide agreement on the need for a holistic understanding of value provision to achieve over-arching enterprise goals.

The need for this holistic management perspective may arguably be even more critical in multi-organizational service provision where the challenges of complex organizational interactions are greater due to client involvement in 'value co-creation'. Many writers have highlighted this change of perspective, where customers are viewed as part of the value creating enterprise. Vargo & Lusch (2006, 2008) described the shift as moving from a traditional goods centered or 'product dominant logic' to an emerging 'service dominant logic'. In the former the customer was seen as the passive recipient of goods, whereas from a service dominant perspective customers form an integral part of value delivery. Recent thinking has recognized that the customer is co-producer or co-creator of value and providers should proactively engage the customer (Ordanini & Pasini, 2008). Prahalad & Ramaswamy (2000, 2003) described customers as being 'co-opted' into the design and delivery of services and suggest that the co-creation of value has shifted our ways of thinking about the boundaries between provider and customer. All parties may now be described as part of a common 'enterprise', increasing the level of diversity and complexity in enterprise management where individual stakeholders may have differing agendas.

Achieving a common enterprise perspective among stakeholders is a challenging task. Research has shown that companies experience difficulties in managing from a whole system rather than an individual company perspective (Storey et al., 2006; Holweg & Pil, 2008). As Spekman & Davies (2004) highlight:

> 'the mindset of many managers favour individual unit thinking over cross-functional and cross-firm thinking'.

A common perspective may be particularly difficult to achieve in public sector to private sector contracts where primary providers rely on actions by independent co-providers, members of the client community, in a multi-cultural setting to achieve successful outcomes (Lovelock & Wirtz, 2004; Klijn et al., 2008).

A logical first step toward a holistic enterprise perspective is to establish a shared understanding of the boundaries of the enterprise and to identify the major provider and client participants involved. Such a shared understanding would form the basis for identifying the interests and value propositions of sub-organizations and the enterprise as a whole. This paper

addresses this step by developing an academically grounded and empirically tested visualization of a complex service enterprise. This is a first step in developing a generic visualization tool capable of providing improved visibility and hence moving towards a shared understanding of the dependencies, leadership, and organizational challenges that arise in multi-organizational service enterprises.

### 1.2 Visual Representations of Organizational Phenomena

Meyer (1991) advocated visual approaches for collecting and representing the "fuzzy multi-dimensional constructs met when analyzing organizations" and the multi-organizational enterprise lends itself to this description. Research on the use of "boundary objects[1]" (Star & Griesemer, 1989) to share knowledge across functional and divisional boundaries was extended by Carlile (2002) to show how, through their use, actors with different knowledge and expertise can create a shared understanding of phenomena. In our case a visual representation of a complex multi-organizational enterprise may form a boundary object for actors involved in the management of the enterprise. Further, from a practical perspective, there are other benefits to using visualization. Structured, visual approaches can enable data gathering and representation to be combined; can assist data analysis and therefore may enable a representation to be built and analysed in the time managers have available (Mills et al., 1998).

As Geiger and Finch (2010) point out, pictures are 'seductive metaphors' for researchers and practitioners alike because they offer the prospect of simplified representations of complex organizational interactions. It is important, however, to understand that the aim here is to develop a visualization that is capable of unfolding, prompting questions, some of which are answered while others provide new avenues of inquiry. These are the properties of 'Epistemic objects' (Knorr Cetina, 2001) which differ from more stable, 'Boundary objects' which tend to be based upon established knowledge. Simply put the picture needs to show the problem not the answer. In this case the visualization needed to show the organizational complexity of the enterprise in terms of its scope and interdependencies and initiate discussion on how the enterprise as a whole is and might be managed.

Typically representations of multiple organizations have been structured around supply or value chains, show flows of components, products and/or services, usually from left to right, taking a holistic view of an organization - one box per company or company location, see Figure 1. Often these representations are centred on a 'focal' company and highlight upstream supply and downstream customer organizations (Croom et al 2000). Such representations emphasise organizations as independent, self-contained elements rather than a collective enterprise with multiple dependencies requiring co-ordination.

[1] Artifacts, documents and perhaps even vocabulary that can help people from different communities build a shared understanding. Note that boundary objects will be interpreted differently by the different communities.

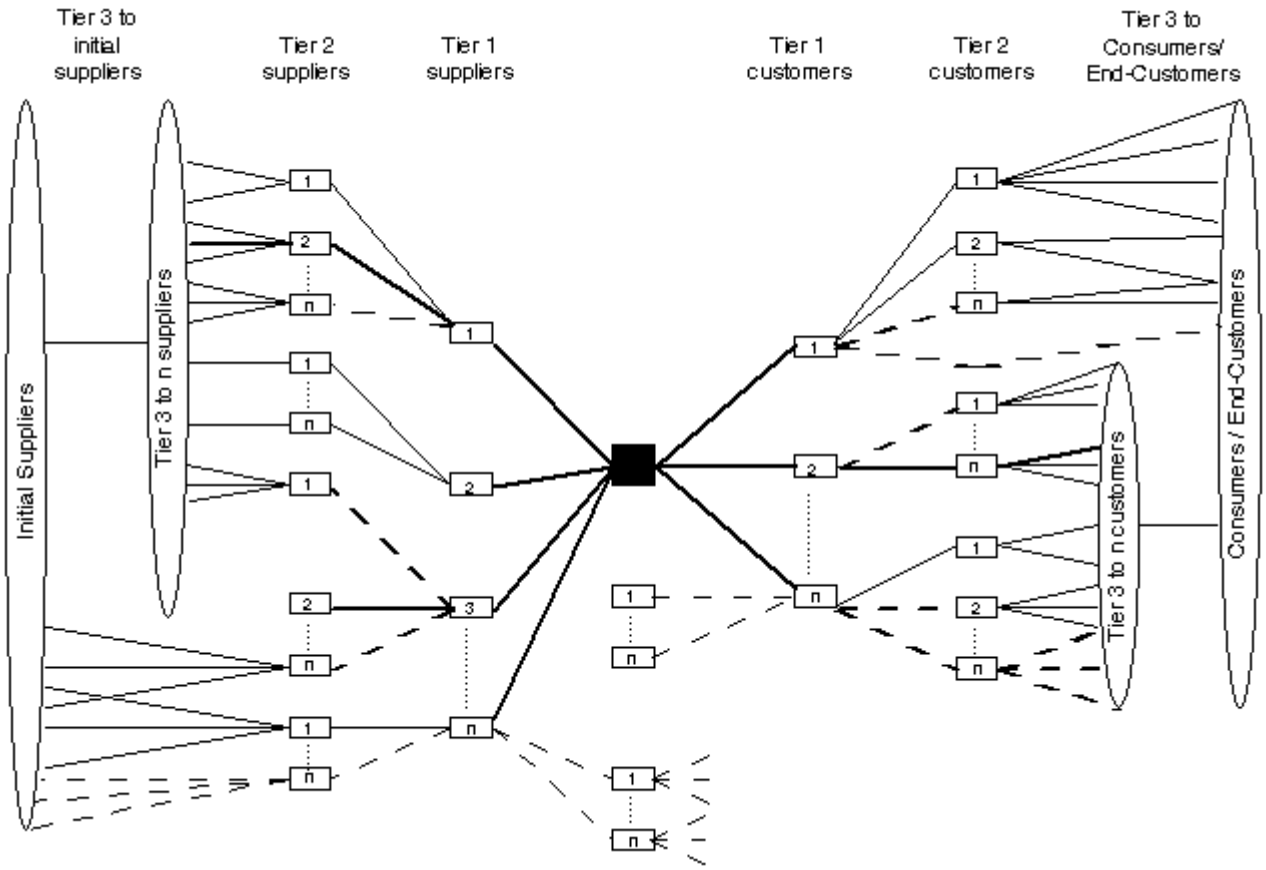


**Figure 1** Types of Inter-company Business Process Links –Whole Network Perspective (based on Lambert et al 1998)

This approach does not acknowledge that many organizations, especially those that are large, complex and hierarchic, do not have processes that fully integrate the behaviour of their sub-parts. Client and provider sub-organizations on which front line service delivery organizations depend upon are frequently not represented, despite their criticality to service delivery and/or value creation.

Many methodologies have been developed to support representation of the detailed flow of products and information for example BPMN[2], COMET[3], or IDEF[4]. Whilst these representations and methods can generate output of great value, they have been considered complex and difficult to interpret when viewed at an enterprise level (Fulscher & Powell, 1999; McCormak & Rauseo, 2005). Furthermore such tools fail to adequately capture the complex interdependence of customer and provider and the interactive nature of service value delivery. The authors therefore looked to the service rather than product focused literature to find appropriate frameworks for a visual representation of service enterprises.

[2] http://www.bpmn.org/

[3] http://www.modelbased.net/comet/index.html

[4] http://www.idef.com/

The most common service-specific visual representation is 'service blueprinting', a potentially useful representation of the interfaces between service providers and clients. A number of variants of service blueprinting are described in the literature, (e.g. Lovelock and Wirtz 2004; Kingman-Brundage 1989 & 1993; Shostack 1984). They are all visual representations of the interactions between the client and provider over time. A typical representation is shown in Figure 2.

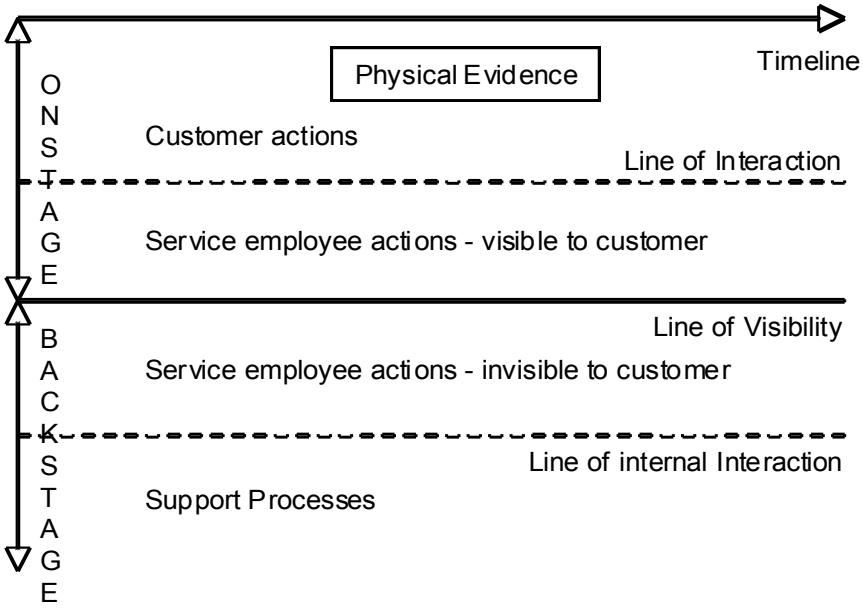


**Figure 2:** Key elements of a service blueprint (adapted from Zeithaml et al, 2009)

The main applications of service blueprinting have been in consumer markets like banking, retail and hospitality and applications have tended to focus on single value-adding processes rather than on the value-adding enterprise itself. A useful concept from blueprinting is the notion of "backstage" and "onstage" (or front office/ back office) - separate but co-ordinated sub organizations within the provider organization. Clients interact with the provider within the on-stage environment (within the line of visibility - Figure 2), which may occur face-to-face or remotely by telephone or the Internet. The provider supports the front office service with back office processes, generally unseen by the client.

Unfortunately, while ideal for consumer service representation, blueprinting is limited in business-business and business-public sector applications for two reasons. First, in these settings both client and provider often have substantial back-offices, so a representation of these services will need to provide front and back office elements for both parties. Second, an important limitation of service blueprinting as originally conceived is its inability to capture dependencies between the client and service provider (Fließ & Kleinaltenkamp, 2004). This is an important restriction since the client's role in obtaining effective and efficient service outcomes is known to be critical (Mills et al, 1983; Mills & Morris, 1986). While many recent papers have emphasized the need for service organizations to structure around notions of front and back office (Davies et al., 2006; Pawar et al, 2009) there remains no method for visual representation of client front and back office involvement in value co-creation. The development of a visual representation of this involvement has the potential to increase

awareness of the potential for value co-creation and the multitude of sub-organizational dependencies within multi-organizational service enterprises. The importance of taking a sub-organizational perspective in representing value co-creation is amplified by increasing complexity in the service task, particularly when client or service provider are themselves complex, as is often the case in business to public sector services (Parry et al., 2011).

## 2.0 Research Method

ATTAC is a long term, whole-aircraft availability contract between BAE Systems and UK MoD, where BAE Systems took prime responsibility to support the RAF Tornado aircraft, delivering defined levels of available aircraft, spares and technical support at a target cost (UK National Audit Office, 2007). While the limitations of single case study research are recognised, this particular case offered a unique opportunity to study complex servitization in depth. It was the first of its scale and complexity between BAE Systems and the MoD and since both parties intended to continue to let and bid for such contracts, this first attempt was an opportunity for both parties to learn and enabled the researchers to gain significant access. The main rationale for choosing one case study is that it is expected to maximise the incidence of phenomena of interest and this is aligned with the exploratory aims of this research (Flyvberg, 2006).

The wider research programme was focused on 'organizational transformation for service delivery' and sought to understand the obstacles and enablers to implementing this servitized contract. The in-depth case study of the ATTAC programme enabled researchers to examine and interpret phenomena in situ and to understand the meanings actors bring to such phenomena. Case study research is also useful when the aim of research is to answer 'why' and 'how' questions (Yin, 2003). This matched the wider aims of this research, to gain an understanding of the drivers for the transformation of such complex service provision contracts and how they materialize in practice.

Interviews were semi-structured, face-to-face, and took an average of 1.5 hours. They enabled researchers to uncover how informants perceived and interpreted situations and events (Bryman, 2008). Themes covered were the organizational scope of the contract; the role of various organizational and sub-organizational units in implementation and the obstacles and enablers they faced in service transformation and service delivery. All interviews were recorded and transcribed and followed the ethical guidelines described by Maylor & Blackmon (2005). Thus research subjects were informed fully about the purpose, methods, and intended uses of the research. Moreover the confidentiality of the data was guaranteed and in line with these standards the interviewees participated voluntarily and free from coercion. Twenty-two provider and six client interviews were undertaken.

To visually map organizational entities involved in the service enterprise a generic framework was developed based on a development of the service blueprinting model (see figure 3).

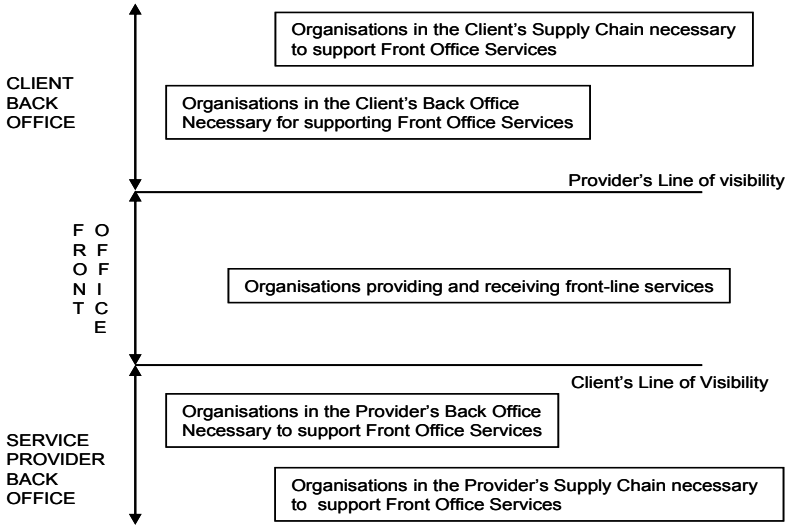


**Fig. 3:** Generic Enterprise Image

Initial data collection identified ten organizational units that were subsequently located on the Enterprise Image. An iterative process for further data collection was then adopted whereby subsequent interviewees were presented with a developing Enterprise Image and asked to comment on the comprehensiveness of the image. The front/back office framework for provider and client organizations provided a methodology for selection of interview respondents. Respondents were initially selected on the basis of their direct involvement in front office contract management and service delivery. Additional respondents were identified by front office staff who identified 'back offices' on the basis of two rationales. First, as organizations whose pro-active assistance was critical in order to deliver good service or help improve that service; and second, as the subject of instances where failure to support the front office had resulted in difficulties in service delivery. Front office staff thus provided clarity on interdependencies from both positive and negative experience. Following initial data collection and development of the Enterprise Image the resulting representation was presented to all interviewee constituencies to assess its validity, utility and to gain feedback on insights generated by the image.

A set of validation and evaluation sessions were arranged to assess the validity and utility of the Image. These sessions were designed to provide an opportunity for participants central to the ATTAC programme to provide feedback on and further develop the enterprise image. Each session began by presenting the enterprise image; participants were invited to comment on the validity of the image and to make any changes they felt were necessary to represent the key organizational units involved in value co-creation. This was followed by general discussion on the issues raised by the image. Finally, to critique the visual representation from a cognitive, academic perspective, the seven dimension framework developed by Bresciani et al. (2008), based on the work of Green (1989) and Hundhausen (2005) was used to assess interviewees' and validation session participants' perceptions of the effectiveness of the Enterprise Image.

## 3.0 Case Findings and Analysis

Since the case is complex it is inevitable that this section contains some detail, however, the key outputs are the front and back office framework and the six defined organizational categories, based on their location, reporting lines and role in providing or supporting the overall service, which form the Enterprise Image. The specific elements identified are sub-organizational units within the provider, client or third party organizations. A total of 21 sub-organizations were identified during data collection. These units varied in the extent to which they focused upon or supported the ATTAC contract. This highlighted that both client and provider back offices needed significant transformation to orientate their behaviour to support front office output in this new form of service contracting. The front office is summarized in in Figure 4 and presented in detail in section 3.1. The full enterprise image (Figure 5) then shows all organizational units within both front and back offices of provider and client. Descriptions of each organizational unit are given in sections 3.2 and 3.3.

### 3.1 Front Office: 'Direct Service Delivery and Contract Management' organizational units

Organizational units in the front office directly interacted in co-creating service value. These organizations were either managed as partnered, provider or client units. Four partnered organizational sub-units were identified, shown as rectangles on the Enterprise Image. These units are directly involved in operational activities for contract delivery and are fully visible in delivering services to both client and provider. These organizations are managed by BAE Systems, located where the operational services are delivered and staffed jointly by provider and client staff. Working as partnerships these organizations can be described as provider and client 'co-producing value' (Vargo & Lusch, 2006). These organizations are represented firmly in the front office. Four such organizations are detailed in Table 1.

**Table 1**: Details of front office organizational units that are partnered and directly involved in service delivery

| FRONT Office (FO) | Organizational Unit | Organizational Role |
|---|---|---|
| FO1- Direct Service/Partnered | Combined Maintenance and Upgrade (CMU) | Undertaking the main hangar maintenance tasks that result in aircraft with increased available flying hours |
| FO2 Direct Service/Partnered | Fleet Management | Provides the planning activities that translate the Forward Squadron requirements for Tornado variants into the schedule of aircraft through CMU |
| FO3 Direct Service/Partnered | Materials provision | Spare part and repair requirements planning and expediting to supply CMU and Forward squadrons. |
| FO4 Direct Service/Partnered | Engineering Support and Airworthiness management | Located at RAF Marham, but represented at other RAF UK bases and Forward squadrons, this organization resolves technical queries and safety issues. |

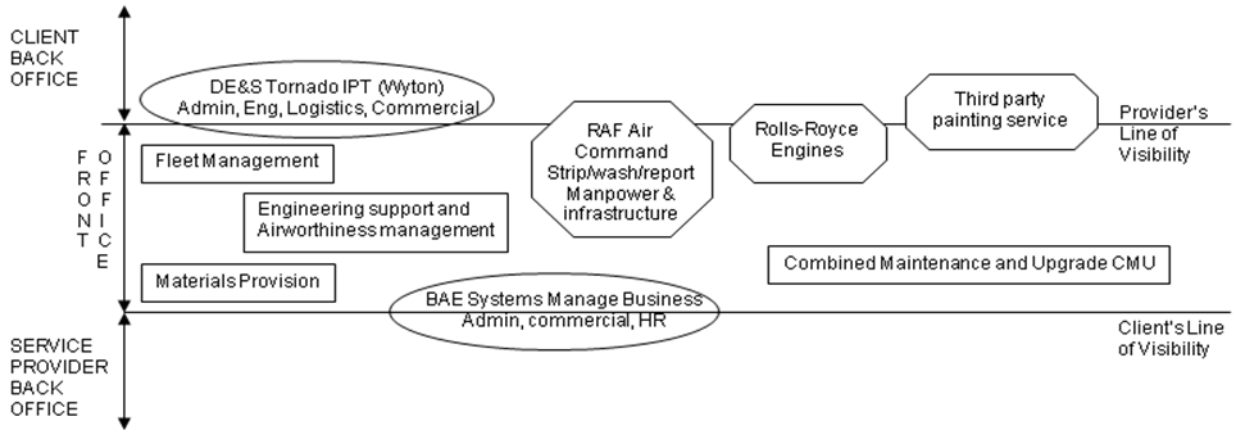


**Figure 4:** Enterprise Image - ATTAC showing Partnered and Independent Direct Service Delivery Organizations plus Specific Contract Focused Organizations

A number of un-partnered 'Direct Service Delivery' organizational units were also identified, shown as Octagons on the Enterprise Image. These organizations are also directly involved in service delivery providing significant inputs to the support provision task of increasing available flying hours. Their role is, however, delivered by single organizations who are not partnered with, managed by, or responsible to BAE Systems. They are placed in positions that overlap front and back offices corresponding to the degree to which they are visible to the wider service enterprise of main clients and providers. In ATTAC there are three main Un-partnered Direct Service Organizations detailed in Table 2.

**Table 2:** Details of front office organizational units that are not partnered but directly involved in service delivery

| FRONT Office (FO) | Organizational Unit | Service Enterprise Role |
|---|---|---|
| FO5 Direct Service/Single organization | Rolls-Royce | Managing the repair and overhaul of Tornado jet engines via a contract between Rolls-Royce and the MoD |
| FO6 Direct Service/Single organization | RAF Air Command | Retained management and control of several key areas of depth maintenance: Air Command perform the strip and wash process and strip report carried out on receipt of aircraft into CMU, plus all work connected with ejector seats, weapons and pylons.<br>Air Command are responsible for the hangars themselves, the supply of electric / hydraulic power etc. and Information Technology infrastructure.<br>Air Command also supply technicians, engineers and management personnel to the Partnered Direct Service Delivery Organizations |
| FO7 Direct Service/Single organization | Third Party Provider | Third party company providing a painting service, an often necessary inline process in the delivery of maintained aircraft and therefore a significant dependency |

The case study data identified a number of sub-organizations located within both the provider BAE Systems and client MoD which were focused solely on the management of the focal contract, shown as ellipses on the Enterprise Image. They are placed in positions that overlap front and back offices corresponding to the degree to which they are visible to main clients and providers. There are two such Specific Contract Management Focused Organizations detailed in Table 3.

**Table 3:** Details of front office 'contract management' organizations

| FRONT office | Organizational Unit | Service Enterprise Role |
|---|---|---|
| FO8 Contract management/single organization | Manage Business (BAE Systems) | Controlled by BAE Systems and operates on-base. It covers the commercial, financial, and Human Resource needs of the contract and operates principally in the front office, handling new contractual requirements, recruitment and admin |
| FO9 Contract management/single organization | Tornado IPT (Integrated Project Team) | Controlled by the MoD via Defence Equipment and Supply (DE&S) and contains a staff covering financial, engineering, logistics, and commercial support of ATTAC. It is located off-base at RAF Wyton. |

### 3.2 Back Office: 'Support Organizations'

'Support Organizations', which are embedded within the back offices of BAE Systems or the MoD, have a wider focus than on ATTAC alone. However, their support is vital in providing the overall service effectively and is critical to service improvement. They are consequently represented as part of the wider ATTAC service enterprise and are shown as parallelograms in the Enterprise Image.

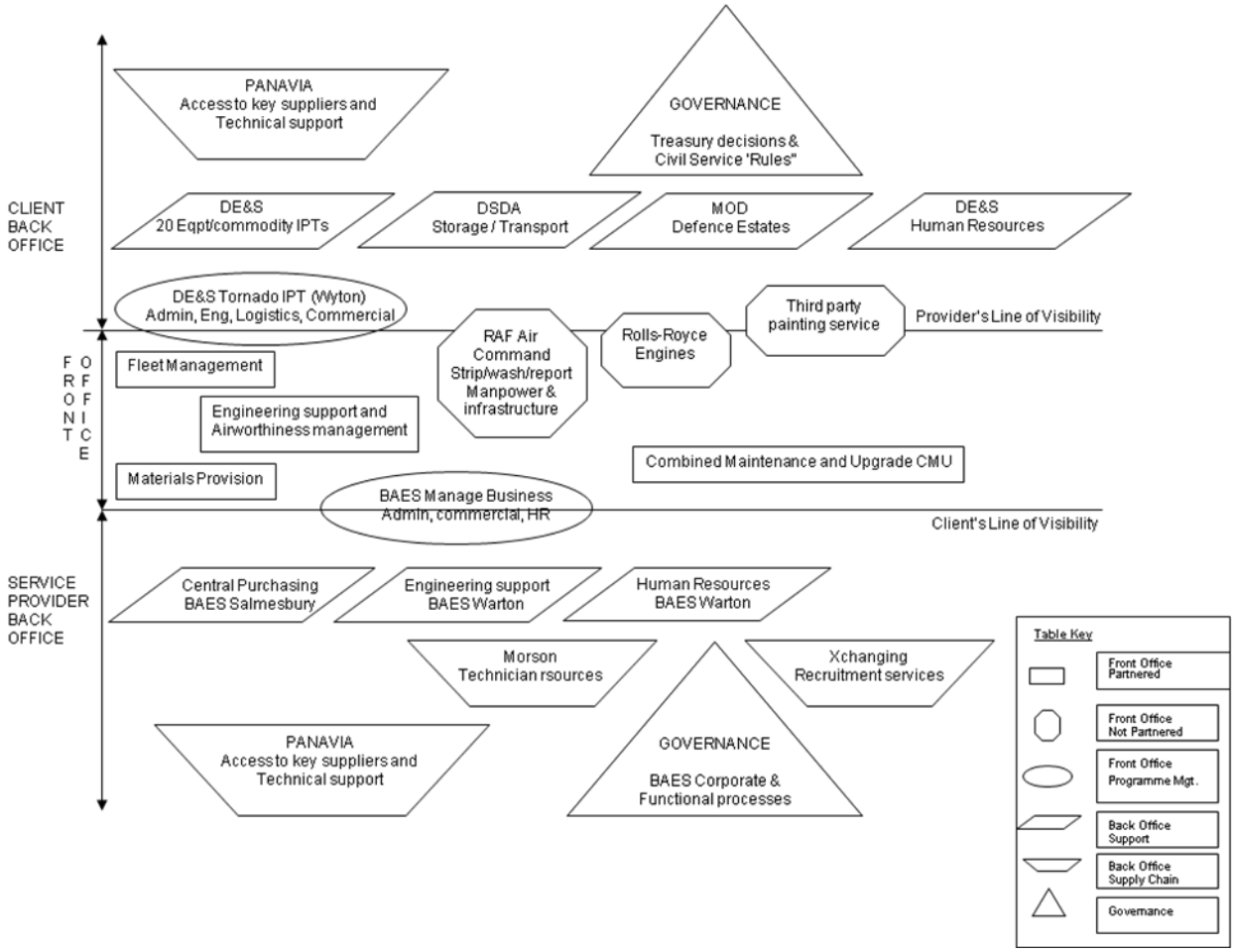


**Figure 5:** Enterprise Image ATTAC Case Study

Four back office MoD organizations and three back-office BAE Systems organizations were identified. They are placed in their appropriate client or provider back office and described in Table 4.

**Table 4:** Details of back office organizational units that are located within provider and client organizations, support service delivery but are not contract specific

| BACK Office (BO) | Organizational Unit | Organizational Role |
|---|---|---|
| BO1 Non-contract specific/ Supporting Service/single organization | Defence Estates | Manage the MoD's estate as a whole providing advice and services on all property matters. Any change to structures on-base need support from this organization. |
| BO2 Non-contract specific/ Supporting Service/single organization | Defence Storage and Distribution Agency (DSDA) | The sole provider of transport and off base storage of Tornado parts. |
| BO3 Non-contract specific/ Supporting Service/single organization Supporting Service<br>(20 Org units) | Equipment/Commodity IPTs (20) | Dealt with here as a single class of organization. Each Equipment/Commodity IPT has a focus on procurement and management of a specific range of equipment (e.g. ejector seats, munitions) that, in their centralised role, they provide to a range of defence platforms. The Tornado IPT has Service Level Agreements with these organizations to provide a wide range of equipment to the ATTAC programme. |
| BO4 Non-contract specific/ Supporting Service/single organization | MoD Human Resources | Supervise HR plans and thus influence the supply of Engineering and supervisory RAF staff into the Partnered Direct Service Delivery Organizations. |
| BO5 Non-contract specific/ Supporting Service/single organization | BAE Systems Central Purchasing | At Salmesbury, Lancashire, providing purchasing back-up |
| BO6 Non-contract specific/ Supporting Service/single organization | BAE Systems' Engineering support | At Warton, Lancashire providing in-depth technical back-up |
| BO7 Non-contract specific/ Supporting Service/single organization | BAE Systems' Human Resources | Supplying appropriate management resources and oversight of human resource development. based at Warton |

### 3.3 'Key Supply Chain Organizations'

Key Supply Chain Organizations are third party suppliers with important roles in the provision of service, illustrated on the image by a Rhombus. They are suppliers who may not be overtly visible to other enterprise partners and are therefore located within the appropriate back office of client or provider. Their services consist of tangible goods, human resources, advice, or opportunities to reduce costs. A number of key supply chain agencies were identified, including one (Panavia) used by both client and provider. However, for reasons of confidentiality the roles of only three are described in table 5 and shown in Figure 5:

**Table 5:** Details of back office organizational units which support service delivery as key suppliers to the prime service provider or client

| BACK Office | Organizational Unit | Service Enterprise Role |
|---|---|---|
| BO8 Non-contract specific/ supply chain organization/partnership | Panavia | Based in Germany, this organization is jointly owned by Alenia, BAE Systems and EADS. It arose from the extensive and complex supply chain for parts, repairs and engineering support resulting from design and manufacture work shares agreed between the UK, Germany and Italy who jointly funded Tornado. Designed more for manufacture than support it remains an important agency for exchanging technical information and bulking up orders for spares from the fleet of over 900 Tornado aircraft built. Both the Tornado IPT and BAE Systems interact with Panavia over technical and supply matters. |
| BO10 Non-contract specific/ supply chain organization | Morsons | The key supplier of contract technicians into the CMU |
| BO11 Non-contract specific/ supply chain organization | XChanging | An important supplier of outsourced HR services, particularly recruitment |

### 3.4 Governance Organizations

Governance organizations were influential in affecting service delivery, shown as a triangle in the image. They refer to central organizational functions that determine how the rest of the organization operates - for example their reporting rules, performance indicators, levels of authority, mandatory processes and policies. BAE Systems has policies set at corporate level within its strong functional structure and the MOD has Civil Service rules to work to. These Governance Organizations may have little direct interaction with operations, but strongly influence its ability to function. The Governance Organization unit aggregates a significant number of functions that are important, but not critical for visualization at this level of analysis. Any functions that are key should be broken out appropriately. Governance Organizations are placed furthest away from front office operations in the appropriate back offices.

## 4.0 Validity, Utility and Evaluation of the Enterprise Image

In order to assess the validity and utility of the Enterprise Image four validation sessions were undertaken. The first was to the BAE Systems senior executives of the ATTAC programme with related Warton-based Human Resource Executives. Two further validation sessions were conducted with the BAE Systems on-base management team with members of RAF Air Command. Finally a validation session was held with a joint group including the two most experienced and senior representatives of the MoD's Tornado project team and senior members of the BAE Systems on-base management team. The outputs of these sessions are

described in section 4.1. A preliminary assessment of the Enterprise Image with respect to the Bresciani et al (2008) framework, with results captured from interviewee and validation session participants is presented in section 4.2.

### 4.1 Validity and Utility of the Enterprise Image

To deliver visual impact and clarity (Bresciani et al., 2008) the Enterprise Image was presented using Microsoft PowerPoint, building the image by revealing organization type by organization type, beginning with front office organizations where direct delivery of service was more clearly apparent to all participants and building gradually into back office organizations where the relationship and inter-dependencies may be less obvious. To further enhance clarity each organization type was coded by shape and colour. From discussions at the presentations five outcomes are described below:

*Validity*. Participants in all four validation sessions acknowledged the validity of the enterprise imaging tool in representing the complex environment within which they co-created value. No new organizational units were suggested for inclusion within the image at any of the feedback sessions. It was recognized, however, that the Enterprise Image may be used to facilitate a variety of discussions around performance development issues and that under such circumstances additional organizational units, specifically further suppliers, for example, might be added. As Geiger and Finch (2010, p. 388) highlight:

> "Pictures help managers in making decisions as to the salient aspects of their complex organizational environment, reject others and increase their awareness that there are still others that could be available for selection even if presently perceived as peripheral to or outside the established network boundaries."

*Complexity*. Those involved in the front office appreciated that the image showed the complexity of their situation (Parry et al., 2011). The image gave, for the first time, 'visibility of all parties, to all parties' involved in value co-creation. For those less involved in ATTAC and those involved but working in back offices the Enterprise Image appeared to provide an appreciation of how many parties were engaged, either partially or fully, in enabling the service activity. Front office units considered that this was useful to demonstrate the challenges they faced in co-creating value across a complex enterprise.

*Interdependence*. The scope of the enterprise and its complexity gave rise to considerable discussion on the interdependencies within the ATTAC Enterprise. Through the Enterprise Image, successful delivery of the contracted service could be seen to be dependent on a greater number of sub organizational units, located in both client and provider, than appeared within the formal contracted framework. While some of this inter-dependence was acknowledged within the formal ATTAC contract, as in for example the formal inclusion of 'government furnished assets' such as hangar buildings provided by Defence Estates, the Enterprise Image generated discussion on the nature of this inter-dependence. How service delivery and the front and back offices were impacted by each other's performance. Furthermore, greater visibility was created for the role and inter-dependence of other back office support functions which had not previously been acknowledged within the formal contract.

*Front & Back Office Coordination*. Another major insight concerned the Enterprise Image's ability to convey the dual challenges of coordinated front and back office management. Discussion involved how back office functions would fail to appreciate the importance and time criticality of their tasks to front office service delivery. The coordination challenge was further highlighted in the review sessions after researchers displayed four Enterprise Images representing all the potential MoD fast jet support contracts: Tornado, Harrier, Typhoon, and the Joint Strike Fighter. Concurrent operations would require similar support from the sub-organizations within client and provider back-offices and competition for time and resource in back office units could create points of tension when prioritizing work.

*Enterprise Management*. Within each review the management of enterprise performance improvement came to the fore. There was mutual provider and client acknowledgement of the need for holistic enterprise level management in order to both deliver and improve on services. When the researchers shared their conclusion that little or no enterprise-level management had yet been found both client and provider leaders agreed that each organization managed ATTAC from their own perspective and this was not ideal. Though the need for ongoing cost reduction and service improvement led by the main Provider was clear in the contract in terms of performance improvement metrics and gain/share[5] incentives it was not made explicit in terms of the duties of all partners, including the client. There was acknowledgement that *all* partners had to be prepared to change methods, invest in training and other implementation aspects of cost reduction and other service improvements if enterprise-wide improvement was to be achieved. This was clearly an important aspect of enterprise management. Feedback from participants suggested that while the Enterprise Image conveyed a 'finished' representation of the ATTAC service enterprise, there would be scope for adding or emphasizing further participants depending upon the enterprise management focus.

### 4.2 Visual Tool Evaluation

To undertake further evaluation of the visualization approach Table 6 summarizes preliminary assessment of the Enterprise Image with respect to the Bresciani et al (2008) framework, with results captured from interviewee and validation session participants:

[5] A system whereby savings could be shared between clients and providers

**Table 6:** Preliminary evaluation of the Enterprise image. (adapted from Bresciani et al, 2008)

| Dimension | Definition | Enterprise Image |
|---|---|---|
| Visual Impact | Extent to which the diagram is attractive and facilitates attention and recall. | Presented in Powerpoint format, using colour and shape to highlight the constituent organizations, distinguish between the contributions of each partner and suggest interdependencies. The use of front and back office appeared to provide a powerful and easily recognized structure |
| Clarity | Property of the diagram to be self-explanatory and easily understandable with reduced cognitive effort | The image builds to convey a complex picture in easily digestible chunks with a growing explanatory storyline for those in back offices. The storyline needs to be documented to enable those without sight of client/provider activities and services rendered in the front office to understand the dependencies present in the enterprise. |
| Perceived[6] finishedness sic | Characterizes the extent to which the visualization resembles a final, polished product | The image builds to an agreed finished portrayal of service enterprise core front and back office elements and to reflect inter-dependencies on other organizational elements. Note also that the boundary of the image will vary depending on current managerial interest |
| Directed focus | Extent to which the diagram draws attention to one or more items. | The image draws attention to the centrality of front office organizations in delivering and developing service; to 'complexity' through the suggested inter-dependences between organizations within the enterprise; and to the need for enterprise management processes |
| Inference support | Extent to which new insights are generated as a result of the constraints of the visualization form. | The image conveys the new insights on the dual challenges of the need for enterprise level organizational design and management, and the need for supporting changes in the functioning within 'parent' back offices. |
| Modifiability | Degree to which the items of the visualization can be dynamically altered in response to the dynamics of the discussion | The enterprise image is produced in Powerpoint format that allows modifications and additions to the image on the basis of discussion. This can take place during discussions or in a follow-up modification process. |
| Discourse management | Control over the discussion and work flow. | A strength of the image is its ability to generate and facilitate multi-party debate since the image presents unanswered questions – not answers. It thus displays features of an epistemic object. It operates as an initiator for discussion, a common reference point for multiple interpretations, and a tool for enterprise level organizational design whereby partners can move from current to create future enterprise images. |

Practitioner validation and this preliminary evaluation based on the framework by Bresciani et al. (2008) suggest that the enterprise image has considerable value for service enterprise practitioners in both representing and supporting management discussion around complexity and interdependence in complex service enterprises. The feedback analysis presented in Table 6 highlights that the inherent complexity of the image requires a process of building the image

[6] Perceived finishedness sic are the words used by Bresciani et al (2008), though a conference paper at this point it presents a scholarly review of visualization attributes from leaders in the field of visual cognition. This particular attribute refers to the ease with which practitioners could add to the picture, develop it further, or see it as an evolving picture. Unfinished pictures enable practitioners to further develop the picture and/or extend the boundary as particular areas are developed in more depth.

from front office where all parties recognize key organizational units to wider areas of provider and customer back office where involved organizational units are less visible and recognizable as delivering service. Such a presentation process, and indeed the entire image construction process, currently requires considerable facilitation and researcher input and there is clearly a need for further development and validation of the visualization and the process used to assemble it.

In the process adopted to develop this first enterprise image, data were collected individually in interviews; shared iteratively as new organizational units were identified and personnel interviewed; and finally validated through group sessions with key service enterprise participants. Further development of the methodology for creating the enterprise imaging tool may allow enterprise stakeholders to co-create their own image with minimal external facilitation. This would create greater shared understanding of the back office support services and governance issues. Further developments may target the 'Modifiability', and 'Discourse management' dimensions through, for example, the use of whiteboards for the initial construction of the image, and a structured procedure for promoting enterprise discussion. Furthermore though an initial classification of organizations has been defined, further case studies may uncover additional organization types and/or an improved classification.

## 5.0 Managerial Implications

The study suggests that the Enterprise Image takes the form of an epistemic object (Knorr Cetina, 2001) that together with its method of construction draws stakeholders into evolving conversations that explore alternative means of governance for multi-organizational service enterprises. Therefore in terms of managerial implications, it is proposed that the Enterprise Image may: support service enterprise management teams in understanding the boundaries and interdependencies of their service enterprise; operate as an initiator and support for discussion at the enterprise level; provide a common reference point for multiple interpretations; form a basis for co-creating holistic enterprise management processes. Though this research was based on an existing contract it may well be that Enterprise Images may be useful during the development of a contract when the interactions between stakeholders can be explored more flexibly. This would potentially enable the inclusion of processes that support holistic service improvement within the contract. Finally, the application of Enterprise Imaging may also cast new light on provider/client interactions within a product-focused contract where traditionally the role of the customer has been underplayed. Clients are involved in a variety of ways including providing design specifications, design and purchasing roles and interdependencies may become clearer as a result of considering their role more formally in value co-creation.

## 6.0 Conclusions and future research

This paper has been developed in the context of a trend in many product-focused companies towards integrating product and service offerings in a service-focused business model. Adopting a service-focused business model presents new managerial/operational challenges for these organizations, particularly in the context of complex engineering services (Baines et

al., 2007; Neely, 2008). Complex service solutions, as Agarwal & Selen (2009) highlight, often require multi-organizational collaboration and the need for a holistic perspective in delivering value. This need is arguably greater in the service context, where providers also face the challenge of acknowledging and accounting for the significantly greater involvement of customers in value co-creation (Vargo & Lusch, 2006). Ramaswamy (2000:2003) described customers as being 'co-opted' into the design and delivery of services and suggest that the co-creation of value has shifted our ways of thinking about the boundaries between provider and customer. All parties may now be described as part of a common multi-organizational 'enterprise', increasing the level of diversity and complexity in enterprise management where stakeholders may have differing agendas.

To support the adoption of a systemic perspective in complex service enterprises, this research has sought to develop a tool to visually represent complex organizational arrangements for the co-creation of value between providers and clients in a servitized setting. The process of Enterprise Imaging, builds upon service blueprinting (Lovelock & Wirtz, 2004; Kingman-Brundage 1989 & 1993; Shostack 1984) and extends it to enable the visual presentation of complex client and provider service contracts where both lead parties have back office functions and engage third party providers. It provides an image that provides increased understanding of the scope and complexities of multi-organizational service delivery. An image is constructed using a framework of shared front office and separate client and provider back office spaces. Beginning with direct service delivery in the front office, organizational units involved in value co-creation are identified and located within the image. Supporting back office and governance processes are also identified and located in the image back offices for providers and clients. The Enterprise Imaging tool was developed through case study analysis of a complex engineering availability service contract awarded to an industrial provider by a public sector client. Within this case study of the ATTAC contract between BAE Systems and MoD client for Fast-jet availability, the Enterprise Imaging approach communicated and provided visibility on four core issues: the significant complexity of the enterprise delivering the service (Agarwal and Selen 2009); the interdependence between organizational units (Ordanini and Pasini, 2008); the need for co-ordination of front and back office functions; and the value of taking an enterprise perspective as opposed to a single organizational viewpoint when seeking to manage a multi-organizational enterprise (Purchase et al., 2011c).

Further research is necessary to identify the extent to which findings within this study are generalizable to other public/private sector enterprises that are acknowledged to be highly complex in their functioning and contain major cultural distinctions. Applications of Enterprise Imaging are planned in a Borough Council; an NHS service provider; and a travel service provider. This research will test the generalizability and utility of the method and help develop a structured methodology for the production of an Enterprise Image that practitioners can use.

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